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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,120	03/01/2006	Sathwant Dosanjh	PAT 3291W-2	7801
26123	7590	10/31/2006	EXAMINER	
BORDEN LADNER GERVAIS LLP WORLD EXCHANGE PLAZA 100 QUEEN STREET SUITE 1100 OTTAWA, ON K1P 1J9 CANADA			CHEN, JUNPENG	
			ART UNIT	PAPER NUMBER
			2618	

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/541,120

Applicant(s)

DOSANJH ET AL.

Examiner

Junpeng Chen

Art Unit

2618

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/15/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statements submitted on December 15, 2005 has been considered by the Examiner and made of record in the application file.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 15** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 15** recites the limitation "the circuit" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear whether it is referring to the synthesizer circuit as in claim 1, which claim 15 is depending on indirectly, or the demodulation circuit as in claim 10. The examiner will examine current claim 15 as it is referring to the demodulation circuit. However, appropriate action is still required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2618

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Clarke (U.S. Patent 6,788,157 B2)**.

Consider **claim 1**, Grant discloses a synthesizer circuit (*read as frequency synthesizer, abstract*) for generating complementary an oscillator signal from an input oscillator signal  $x(t)$ , said complementary oscillator signal being shifting in frequency from said input oscillator signal  $x(t)$ , said synthesizer circuit comprising: a divider having

Art Unit: 2618

an input and generating divided output based on a signal received at said input; a mixer for receiving said input oscillator signal  $x(t)$ , and mixing said input oscillator signal  $x(t)$  with said the output of said divider to generate an output signal; a removal means for receiving said output signal of said first mixer and removing undesired frequency signal from said output signal, providing said frequency-shifted oscillator signal as an output; the output of said first removal means also being connected to the input of said divider *(read as regenerative frequency divider 116, which has input signal  $f_{vco}$ , mixer 124, filter 128, division block 130, and an output, Figure 2, lines 4-61 of column 4. Similar regenerative divider is described in Figure 9 and corresponding descriptions, page 6 of 10 of Grant. "Solving the Direct Conversion Problem", Planet Analog. Retrieved From the Internet: <URL: <http://www.planetanalog.com/printableArticle.jhtml?articleID=12801318>> 2000 (From IDS)).*

However, Clarke fails to disclose that the synthesizer circuit for generating another complementary oscillator signal from input oscillator signal  $x(t)$  and it is being shifting in frequency from said input oscillator signal  $x(t)$ , and another mixer for receiving said input oscillator signal  $x(t)$ , and mixing said input oscillator signal  $x(t)$  with said another output of the divider to generate an output signal; and another removal means for receiving said output signal of said second mixer and removing undesired frequency signals from said output signal, thus providing said frequency-shifted oscillator signal as an output.

Nonetheless, the Examiner takes Official Notice of the fact that at the time the invention was made, it was well known in the art that an regenerative divider could comprises two channels, one working on the in-phase signal, one working on the quadrature signal, each channel has a mixer which receives radio frequency signal and divide by 4 circuit which receives an output of the mixer and which itself provides an input to a respective second input of the mixer, the output of the divide by 4 divider is also provided to the respective in-phase and quadrature mixers (*See line 61 of column 1 to line 3 of column 2 by Atkinson et al. (U.S. Patent 7,106,805 B2) for the supports of above Official Notice*). By incorporating the regenerative divider above, a person with ordinary skill in the art would modify the regenerative divider taught by Clarke, to have two mixers, two filters, and a divider for generating two outputs, namely, in-phase and quadrature phase signals.

Therefore, it would have been obvious for a person with ordinary skill in the art at the time the invention was made to design a two channel regenerative divider in a synthesizer circuit for the purpose of generating in-phase and quadrature phase oscillator signals.

Consider **claim 2, as applied to claim 1 above**, Clarke further discloses the two removal means comprises first and second filters, (*read as after incorporated the well known fact in the art into the teachings of Clarke, the regenerative divider would have two filters, each could be the same kind of filter as band pass filter 128, Figure 2, lines 4-61 of column 4*).

Consider **claim 3, as applied to claim 2 above**, Clarke further discloses wherein said first and second filters comprises first and second high pass filters (read as the fact that each band pass filter is formed by a lower pass filter and a high pass filter).

Consider **claim 4, as applied to claim 2 above**, Clarke further discloses wherein said first and second filters comprises first and second notch filters (*read as band pass filters above are being used in the regenerative frequency divider, which included in a frequency synthesizer inside a narrow-band VCO 114, Figures 1 and 2, line 40 of column 3 to 11 of column 4*).

Consider of **claim 5 and claim 6, as applied to claim 1 above**, Clarke further discloses wherein said divider comprises a divide-by-n divider as in claim 5 and said divider comprises a divide-by-four divider as in claim 6 (*read as division block 130 divides the frequency of a received input signal, by N, where N is a programmable integer, Figure 2, lines 4-61 of column 4. Also, see similar regenerative divider is described in Figure 9 and corresponding descriptions, page 6 of 10 of Grant. "Solving the Direct Conversion Problem", Planet Analog. Retrieved From the Internet: <URL: <http://www.planetanalog.com/printableArticle.jhtml?articleID=12801318>> 2000 (From IDS)*)).

Consider **claim 7, as applied to claim 1 above**, Clarke further discloses wherein said first and second removal means comprise first and second harmonic subtraction circuits (*read as regenerative frequency divider 116 performs fractional multiplication of the frequency of the input signal received from the VCO 114, it removes any harmonic relationship between the final output frequency and the operating frequency of the VCO*

*114, thus, harmonic subtraction filters could be used perform above function, Figure 2, lines 47-61 of column).*

Consider **claim 9, as applied to claim 7 above**, Clarke, as modified by Grant, further discloses each of said mixers comprises a harmonic rejection mixer (*read as regenerative frequency divider 116 performs fractional multiplication of the frequency of the input signal received from the VCO 114, it removes any harmonic relationship between the final output frequency and the operating frequency of the VCO 114, thus, harmonic subtraction filters and harmonic rejection mixers could be perform above function , Figure 2, lines 47-61 of column).*

**Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Clarke (U.S. Patent 6,788,157 B2)**, in view of **Grant. "Solving the Direct Conversion Problem", Planet Analog. Retrieved From the Internet: <URL: <http://www.planetanalog.com/printableArticle.jhtml?articleID=12801318>> 2000 (From IDS))**.

Consider **claim 8, as applied to claim 7 above**, Clarke discloses the claimed invention above, but fails to specifically discloses the synthesizer circuit comprises a polyphase filter for filtering said input signal  $x(t)$  prior to feeding said input signal  $x(t)$  into said first and second mixers.

Nonetheless, in related art, Grant discloses the use polyphase filter before inputting signals into the mixers in a LO generator, Figure 9 and 10 and corresponding description, pages 6 and 7 of 10.



Therefore, it would have been obvious for a person with ordinary skill in the art at the time the invention was made to incorporate the teachings of Grant into the teachings of Clarke for the purpose of producing I and Q signals, pages 6 and 7 of 10 of Grant.

**Claims 10-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Clarke (U.S. Patent 6,788,157 B2)** in view of **Manku (U.S. PGPub 20050180528 A1)**.

The applied reference, Manku (U.S. PGPub 20050180528 A1), has a common Assignee: SIRIFIC WIRELESS CORPORATION and a common Inventor: Tajinder Manku, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Consider **claim 10, as applied to claim 1 above**, Clarke discloses the synthesizer circuit as per claim 1, but fails to disclose that a demodulation circuit for down-converting an input signal RF, comprising above claimed synthesizer circuit, in combination with: a third mixer for receiving said input signal RF, and mixing said input signal RF with multi-tonal signal  $\phi_1$ , to generate an output signal  $\phi_1$  RF; a fourth mixer for receiving said signal  $\phi_1$  RF as an input and mixing said signal  $\phi_1$  RF with a mono-tonal mixing signal  $\phi_2$ , to generate an output signal  $\phi_1 \phi_2$  RF; first and second signal generators for receiving said complementary sin and cos oscillator signals from said synthesizer circuit; said first signal generator for generating said multi-tonal mixing signal  $\phi_1$ ; and said second signal generator for generating said mono-tonal mixing signal  $\phi_2$ , where  $\phi_1 * \phi_2$  has significant power at the frequency of a local oscillator signal being emulated, and neither of said  $\phi_1$  nor said  $\phi_2$  having significant power at the carrier frequency of said input signal RF or said LO signal being emulated.

However, in related art, Manku disclose a demodulator circuit for emulating the down conversion of an input signal  $x(t)$  with a local oscillator (LO) signal, the demodulator circuit comprising: a first mixer for receiving the input signal  $x(t)$ , and mixing the input signal  $x(t)$  with a multi-tonal mixing signal  $\phi_1$ , to generate an output signal  $\phi_1 x(t)$ ; a second mixer for receiving the signal  $\phi_1 x(t)$  as an input, and mixing the signal  $\phi_1 x(t)$  with a mono-tonal mixing signal  $\phi_2$ , to generate an output signal  $\phi_1 \phi_2 x(t)$ ; a first signal generator for generating an oscillator signal  $f_1$ ; a second signal generator for generating the mono-tonal mixing signal  $\phi_2$ , where the frequency of  $f_1$  is a multiple of the frequency of  $\phi_2$ ; and a logic circuit for receiving

Art Unit: 2618

the oscillator signal  $f_1$  and the mono-tonal mixing signal  $\phi_2$ , and generating the mono-tonal mixing signal  $\phi_1$ , where  $\phi_1 \cdot \phi_2$  has significant power at the frequency of the local oscillator signal being emulated, neither of the  $\phi_1$  nor the  $\phi_2$  having significant power at the carrier frequency of the input signal  $x(t)$  or the LO signal being emulated, paragraph [0029] and abstract.

Therefore, it would have been obvious for a person with ordinary skill in the art at the time the invention was made to incorporate the teachings of Manku, into the teachings of Clarke for the purpose of using Clarke's regenerative divider circuit to provide I and Q signals as oscillator signals to a demodulation circuit for emulating the down conversion of an input signal.

Consider **claim 11, as applied to claim 10 above**, Clarke, as modified by Manku, discloses the said first signal generation circuit includes an exclusive-OR gate (XOR) *(read as after incorporated the teachings of Manku into the teachings of Clarke, the demodulation circuit would comprises an simple logic exclusive-OR (XOR) gate, Figures 2 and 3, paragraphs [0053]-[0054] by Manku).*

Consider **claim 12, as applied to claim 10 above**, Clarke, as modified by Manku, discloses the said mixers comprises a differential device *(read as after incorporated the teachings of Manku into the teachings of Clarke, the differential mixers 82 and 84, Figure 4, paragraph [0062] by Manku).*

Consider **claim 13, as applied to claim 10 above**, Clarke, as modified by Manku, discloses wherein each of said mixers comprise a harmonic rejection mixer *(read as regenerative frequency divider 116 by Clarke performs fractional multiplication*

*of the frequency of the input signal received from the VCO 114, it removes any harmonic relationship between the final output frequency and the operating frequency of the VCO 114, thus, harmonic subtraction filters would be used perform above function in the demodulation circuit, Figure 2, lines 47-61 of column of Clarke).*

Consider **claim 15, as applied to claim 10 above**, (See **Claim Rejections - 35 USC § 112**) Clarke, as modified by Manku, discloses the demodulation circuit further comprising a high pass filter electrically connected between said third mixer and said fourth mixer (*read as after incorporated the teachings of Manku into the teachings of Clarke, the differential mixers 82, 84 connected together via a high pass filter (HPF) 86, Figure 4, paragraph [0062] by Manku*).

**Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Clarke (U.S. Patent 6,788,157 B2)**, in view of **Manku (U.S. PGPub 20050180528 A1)**, and in further view of **Grant. "Solving the Direct Conversion Problem", Planet Analog. Retrieved From the Internet: <URL: <http://www.planetanalog.com/printableArticle.jhtml?articleID=12801318>> 2000 (From IDS))**.

Consider **claim 14, as applied to claim 10 above**, Clarke, as modified by Manku, discloses the claimed invention above, but fails to specifically disclose the demodulation circuit comprises a polyphase filter.

Nonetheless, in related art, Grant discloses the use polyphase filter before inputting signals into the mixers in a LO generator, Figure 9 and 10 and corresponding description, pages 6 and 7 of 10.

Therefore, it would have been obvious for a person with ordinary skill in the art at the time the invention was made to incorporate the teachings of Grant into the teachings of Clarke, which modified by Manku, for the purpose of producing I and Q signals, pages 6 and 7 of 10 of Grant.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Atkinson; Simon et al.	US 7106805 B2	3G radio
Kung; William et al.	US 20060141952 A1	Multi-mode modulator and transmitter
Manku; Tajinder et al.	US 7046980 B1	Method and apparatus for up-and down-conversion of radio frequency (RF) signals
Atkinson; Simon	US 6731923 B2	Direct conversion circuit for radio frequency signals
Clarke, Robert M.	US 20040080373 A1	PROGRAMMABLE FREQUENCY SYNTHESIZER
Strange; Jonathan R.	US 6574462 B1	Local oscillator apparatus for radio frequency communication systems
Atkinson, Simon	US 20010039182 A1	Direct conversion circuit for radio frequency signals

Otaka; Shoji	US 6148181 A	Radio apparatus adapted to remove image components from local oscillating signals
Durrant; Randolph L. et al.	US 5953370 A	Apparatus for receiving and correlating a spread spectrum signal
Durrant; Randolph L. et al.	US 5881100 A	Method and apparatus for coherent correlation of a spread spectrum signal

7. Any response to this Office Action should be **faxed to (571) 273-8300 or mailed to:**

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junpeng Chen whose telephone number is (571) 270-1112. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Junpeng Chen  
J.C./jc

October 16, 2006

EDAN ORGAD  
PATENT EXAMINER/TELECOMM.

*Edan Orgad* 10/18/06